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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/559,960	12/08/2005	Michael C. Gaidis	FIS920030127US1	6525

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INTERNATIONAL BUSINESS MACHINES CORPORATION
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EXAMINER	
GOODWIN, DAVID J	

ART UNIT	PAPER NUMBER
2818	

NOTIFICATION DATE	DELIVERY MODE
12/22/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

EFIPLAW@US.IBM.COM

Office Action Summary	Application No.	Applicant(s)	
	10/559,960	GAIDIS, MICHAEL C.	
	Examiner	Art Unit	
	DAVID GOODWIN	2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 June 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7 and 16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7 and 16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 2, 3, 6, 7, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwata (US 6795334) as applied to claim 1 and further in view of Tsang (US 6909630).

3. Regarding claim 1.

4. Iwata teaches a semiconductor device comprising a magnetic random access memory device. Said device comprises a lower metallization conductive line (71) in a dielectric layer (fig 101). A lateral metal strap (72) conductively couples to said lower conductive line (71). A magnetic tunnel junction stack (73) on said conductive strap (72). A metal shield (74) formed over said magnetic tunnel junction stack (73), said conductive metal shield (74) being substantially coextensive with said metal strap (72). An upper conductive line (81) conductively coupled to said metal shield (74) (fig 101) (column 60 line 1-column 62 line 40).

5. Iwata does not teach the structure of the magnetic tunnel junction.

6. Tsang teaches the structure of a magnetic tunnel junction. Said junction comprises a non magnetic layer (3102) formed between a lower magnetic layer (3101) and an upper magnetic layer (3103). A metal hard mask layer (3104) formed on said

upper magnetic layer (3103). The distance between the upper conductive (32) and the upper magnetic layer (3103) is define by the total thickness of the intervening layer, the metal hard mask (3104) (fig 7) (column 6 lines 10-40).

7. It would have been obvious to one of ordinary skill in the art to form a magnetic tunnel junction comprised of non-magnetic and magnetic layers in order that during writing current will yield magnetic fields that will reorient the free layer and thereby store data.

8. Regarding claim 2.

9. Iwata teaches a semiconductor device comprising a magnetic random access memory device. Said device comprises a lower metallization conductive line (71) in a dielectric layer (fig 101). A lateral metal strap (72) conductively couples to said lower conductive line (71). A magnetic tunnel junction stack (73) on said conductive strap (72). A metal shield (74) formed over said magnetic tunnel junction stack (73), said conductive metal shield (74) being substantially coextensive with said metal strap (72). An upper conductive line (81) conductively coupled to said metal shield (74) (fig 101) (column 60 line 1-column 62 line 40).

10. Iwata does not teach the structure of the magnetic tunnel junction.

11. Tsang teaches the structure of a magnetic tunnel junction. Said junction comprises a non magnetic layer (3102) formed between a lower magnetic layer (3101) and an upper magnetic layer (3103). A metal hard mask layer (3104) formed on said upper magnetic layer (3103). The distance between the upper conductive (32) and the

upper magnetic layer (3103) is define by the total thickness of the intervening layer, the metal hard mask (4104) (fig 7) (column 6 lines 10-40).

12. It would have been obvious to one of ordinary skill in the art to form a magnetic tunnel junction comprised of non-magnetic and magnetic layers in order that during writing current will yield magnetic fields that will reorient the free layer and thereby store data.

13. Regarding claim 3.

14. Tsang teaches the thickness of the hardmask (3104) is 300 angstroms.

15. Differences in thickness will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such thicknesses are critical. "Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the workable ranges by routine experimentation". *In re Aller*, 220 F.2d 454,456,105 USPQ 233, 235 (CCPA 1955).

Since the applicant has not established the criticality (see next paragraph), and this thickness has been used in similar devices in the art (see, e.g., Tsang) it would have been obvious to one of ordinary skill in the art to use these values in the device.

CRITICALITY

The specification contains no disclosure of either the critical nature of the claimed thickness or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

16.

17. Regarding claim 6

18. Iwata teaches that the lower metallization conductive line (71) is formed at a first conductive level of the mram device and the upper conductive line (81) is formed at a second conductive level of the mram device (fig 101).

19. Regarding claim 7.

20. Iwata teaches a wordline (67) formed at a lower conductive level and adjacent said lower conductive line (74), said wordline (67) electrically insulated from said lateral conductive strap (72) and said wordline (67) disposed below said magnetic tunnel junction (73). Wherein said upper conductive line comprises a bitline of an individual mram cell and said cell including said magnetic tunnel junction and said wordline (101).

21. Regarding claim 16.

22. Iwata teaches that the magnetic tunnel junction stack (73) is not coextensive with the metal strap (fig 101).

23. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwata (US 6795334) in view of Tsang (US 6909630) as applied to claim 1 in view of Kim (US 6806096).

24. Regarding claim 4

25. Iwata in view of Tsang teaches elements of the claimed invention above.

26. Iwata in view of Tsang does not teach the use of tantalum in the metal layer.

27. Kim teaches a semiconductor MRAM device. Said device comprises a metal capping layer (126) comprising a combination tantalum and tantalum nitride (column 6 lines 1-5).

28. It would have been obvious to one of ordinary skill in the art to make the second metal layer of tantalum nitride in order to increase conductivity and reduce diffusion.

29. Regarding claim 5.

30. Kim teaches a semiconductor MRAM device. Said device comprises a metal capping layer (126) comprising a combination tantalum and tantalum nitride (column 6 lines 1-5).

31. It would have been obvious to one of ordinary skill in the art to make the first metal layer of tantalum nitride in order to increase conductivity and reduce diffusion.

32. A claim to the structure of a device must distinguish from the prior art based upon differences in the structure rather than in differences in how the structure is made (MPEP 2113).

Response to Arguments

33. Applicant's arguments filed 9/25/09 have been fully considered but they are not persuasive.

34. The applicant argues that Iwata does not teach a metal hard mask.

35. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID GOODWIN whose telephone number is (571)272-8451. The examiner can normally be reached on Monday through Friday, 9:00am through 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Loke can be reached on (571)272-1657. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Djg

/STEVEN LOKE/
Supervisory Patent Examiner, Art Unit 2818